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IS 8252-6 (1976): Environmental Tests for Aircraft Equipment, Part VI: Waterproofness [TED 14: Aircraft and Space Vehicles]

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UDC 629·13·05 : 620·193·2

“REAFFIRMED 1990” IS : 8252 (Part VI) - 1976

(Reaffirmed 2005)

Indian Standard

ENVIRONMENTAL TESTS FOR AIRCRAFT EQUIPMENT

PART VI WATERPROOFNESS

1. Scope — Specifies tests for waterproofness applicable to equipment in aircraft which is required to operate when exposed to conditions where water is sprayed on it, as in driving rain, or where water is dripping on it, such as condensation falling from an adjacent aircraft structure. It covers two grades of waterproofness.

2. Grades of Waterproofness — When required by the relevant equipment specification the equipment shall be declared as complying with either of the following grades of waterproofness:

a) *Grade A (Spray-Proof)* — Equipment which is subjected to driving rain or required to operate when water is sprayed on it from any angle. Typical equipment in this grade would be that which is installed in the wheel bay of an aircraft where it would be subjected to rainwater being sprayed on it from a wet runway. Grade A equipment shall be subjected to the test described in **3**.

Equipment which has been demonstrated as being hermetically sealed may be considered as waterproof to Grade A requirements provided that any electrical terminals are of a suitable design to ensure adequate insulation.

b) *Grade B (Drip-Proof)* — Equipment which is required to operate in conditions when moisture droplets may be expected to fall on it, particularly unsealed equipment which may be so located that condensation from neighbouring structures, particularly the aircraft frame, occurring during the descent of a cold aircraft into a humid atmosphere can fall directly upon parts of equipment critical to wetting. Grade B equipment shall be subjected to the test described in **4**.

3. Test for Grade A (Spray-Proof) Equipment

3.1 *Test Conditions*

3.1.1 The equipment shall be subjected to this test in its normal mounting attitudes unless specified otherwise in the relevant equipment specification.

3.1.2 All connections to the equipment shall be made as in normal operation or alternatively cover plates having equivalent sealing properties shall be fitted.

3.1.3 If equipment is fitted with removable covers, etc, these shall be placed in position as in normal operation.

3.1.4 During the test the equipment shall, if required by the relevant equipment specification, be operated in the manner most vulnerable to the effects of ingress of water.

3.2 *Initial Examination* — The equipment shall be visually inspected and electrically and mechanically checked as required in the relevant equipment specification.

All sealing features shall be checked to determine whether they have been mounted correctly.

3.3 *Test Procedure*

3.3.1 The equipment shall be subjected to a shower of water from the shower head nozzle specified in **3.3.3**, which shall be directed perpendicularly to the most vulnerable areas of the equipment, as stated in the relevant equipment specification. Each of the areas under test shall be exposed to the spray for a minimum period of 15 minutes.

Note — If desired, the test may be applied simultaneously to more than one area at a time by using an appropriate number of shower heads.

3.3.2 The shower head shall be located not more than 2·5 metres from the area under test.

Aircraft and Space Vehicles Sectional Committee, EDC 74; Environmental and Operating Conditions for Aircraft Equipment Subcommittee, EDC 74 : 4 [Ref : Doc : EDC 74 (2557)]

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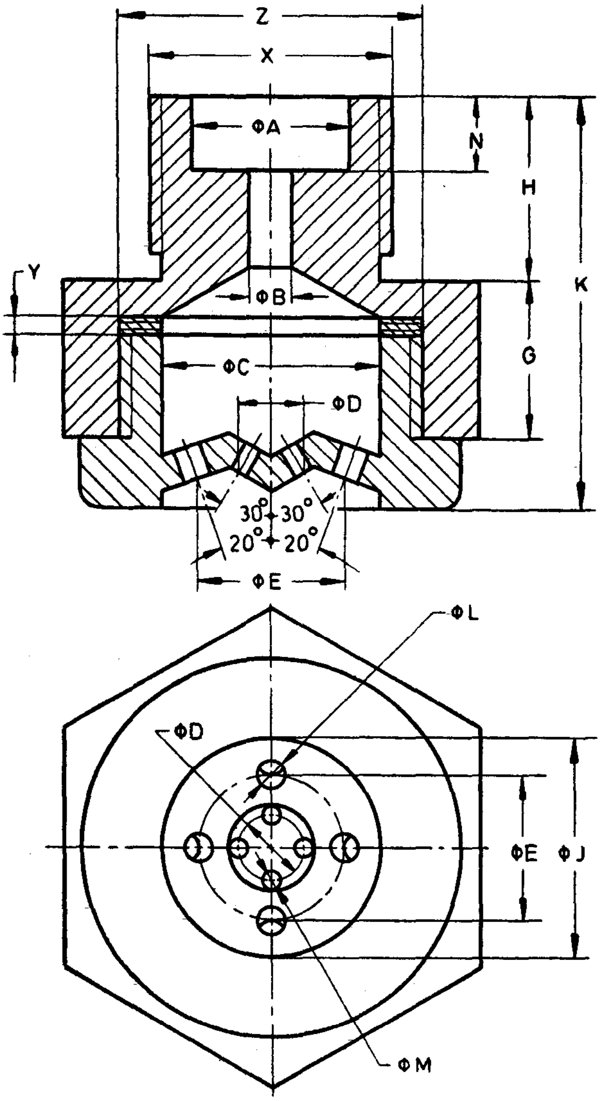
3.3.3 The dimensions of the shower head nozzle shall comply with the dimensions specified in Fig. 1. This will provide shower with a divergent cone angle of approximately 35°.



All dimensions in millimetres.

A	*B*	*C*	*D*	*E*	*G*	*H*	*J*	*K*	*L*	*M*	*N*	*X**	*Y*	*Z*†
13·5	3·7	19·0	5·6	12·7	13·5	15·9	19	35·7	2·3	1·6	6·35	½	1·6	¾

*IS : 554-1975 'Dimensions for pipe threads where pressure tight joints are required on the threads (*second revision*)'.

†IS : 2643-1975 'Dimensions for pipe threads for fastening purposes'.

FIG. 1 DIMENSIONS FOR SHOWER HEAD

3.3.4 The inlet pressure to the shower head nozzle shall be 200 kPa.

Note — This inlet pressure corresponds to a rate of water consumption of 450 *l* ±10 percent per hour.

3.4 *Recovery* — No recovery procedures are to be carried out at the completion of the test unless permitted and stated in the relevant equipment specification.

3.5 *Final Examination* — The equipment shall be visually examined for penetration of water and, if required, shall be electrically and mechanically checked as prescribed by the relevant equipment specification.

3.6 *Information to be Stated in the Relevant Equipment Specification* — When this test is included in the relevant equipment specification the following details shall be given, as far as they are applicable:

	Relevant Sub-clause
a) Attitudes of the equipment, if other than normal	3.1.1
b) Operation during test	3.1.4
c) Initial visual examination, electrical and mechanical checks	3.2
d) Sides to be sprayed, if other than six	3.3.1
e) Recovery procedures, if permitted	3.4
f) Final examination, electrical and mechanical checks	3.5

4. Test for Grade B (Drip-Proof) Equipment

4.1 *Test Conditions*

4.1.1 The equipment shall be subjected to this test in its normal mounting attitudes unless specified otherwise in the relevant equipment specification.

4.1.2 All connections to the equipment shall be made as in normal operation, or alternatively cover plates having equivalent sealing properties shall be fitted.

4.1.3 If equipment is fitted with removable covers, these shall be placed in position as in normal operation.

4.1.4 During the test the equipment shall, if required by the relevant equipment specification, be operated in the manner most vulnerable to the effects of ingress of water.

4.2 *Initial Examination* — The equipment shall be visually inspected and electrically and mechanically checked as required in the relevant equipment specification.

4.3 *General Description of Test* — Water is allowed to drip at a specified rate on to the equipment, from a source such that the quantity of water per unit area is controlled and constant.

4.4 *Description of Test Apparatus* — The apparatus required shall be a water container of adequate plan size having a number of orifices spaced at intervals of 25 mm on a square grid in its base which permit the water to drip freely and individually, at the specified rate. The size of the container will depend upon the plan area of the equipment to be tested; it may be restricted to such dimensions as to cover selected critical areas of large equipment if permitted by the relevant equipment specification. Suitable means shall also be provided to maintain the flow and head of water for the specified time (*see* Fig. 2).

4.5 *Test Procedure*

4.5.1 The equipment shall be subjected to water droplets falling vertically from the dispenser at a height of 1 metre.

4.5.2 Unless otherwise stated in the relevant equipment specification, the water shall be dispensed at an overall rate of not less than 350 $l/(m^2/h)$ for a period of not less than 15 minutes.

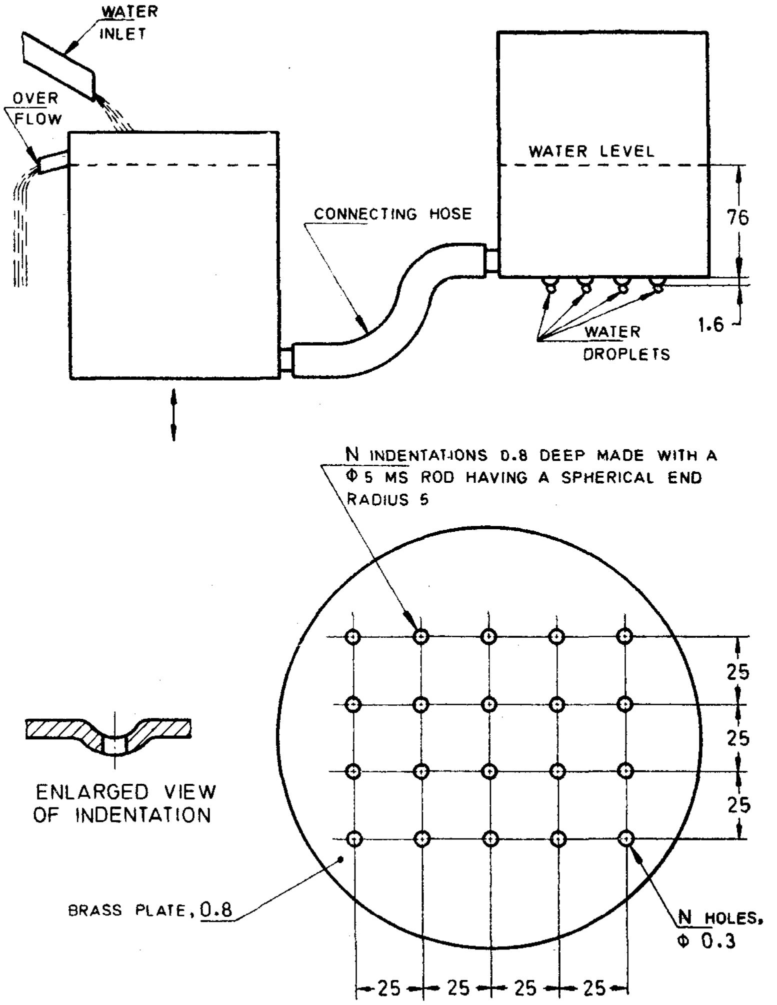
Note — This rate approximates to 1 droplet per second from each orifice.

4.6 *Recovery* — No recovery procedures are to be carried out at the completion of the test unless permitted and stated in the relevant equipment specification.

4.7 *Final Examination* — The equipment shall be visually examined for penetration of water, and if required, shall be electrically and mechanically checked as prescribed by the relevant equipment specification.

4.8 *Information to be Stated in the Relevant Equipment Specification* — When this test is included in the relevant equipment specification the following details shall be given, as far as they are applicable:

	Relevant Sub-clause
a) Attitude of equipment, if other than normal	4.1.1
b) Operation during test	4.1.4
c) Initial visual examination, electrical and mechanical checks	4.2
d) Critical areas of equipment to be tested	4.4
e) Quantity of water and time, if other than as specified	4.5.2
f) Recovery procedure, if permitted	4.6
g) Final examination, electrical and mechanical checks	4.7



All dimensions in millimetres.

FIG. 2 TEST RIG FOR DRIP TEST

EXPLANATORY NOTE

This standard is a part of a series of Indian Standards specifying simulated environmental tests to which aircraft equipment is to be subjected to demonstrate that it would function satisfactorily under normal aircraft operating conditions. The relevant equipment specification shall define the appropriate test severities and the criteria for correct functioning.

This Indian Standard is based on Draft International Standard ISO/DIS 2655 ' Environmental tests for aircraft equipment — Part 2·5: Waterproofness ', issued by International Organization for Standardization.

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